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TANAKA, et al., 10/790,212
08 February 2007 Amendment
Responsive to 08 November 2006 Office Action

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An etching apparatus functioning to process a wafer having on a surface on which a ~~desirably~~ patterned mask for etching is formed, in a plasma etching process chamber and trim-treat said mask under etching action by plasma so as to reduce the width of said patterned mask, said apparatus comprising:

a plasma monitor for measuring an amount of radicals in said plasma process chamber; and

trimming condition calculating means for calculating a condition required for ~~said~~ trimming treatment to obtain a desired mask width on the basis of a precedently measured width dimension of said patterned mask and a precedently measured amount of ~~edge-roughness-sidewall striation~~ of mask sidewalls ~~in a lateral direction~~ of the mask, as well as the amount of radicals measured by said plasma monitor,

wherein the trimming treatment is carried out for the trimming condition calculated by said trimming condition calculating means.

2. (Original) An etching apparatus according to claim 1, wherein continuously to said trimming treatment, a treatment of etching said wafer is performed in said plasma etching process chamber.

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3. (Currently Amended) An etching apparatus according to claim 1, wherein the ~~edge-roughness-sidewall striation~~ amount is calculated on the basis of an aspect ratio of a mask ~~edge-roughness-sidewall striation~~ portion.

4. (Currently Amended) An etching apparatus according to claim 1, wherein the ~~edge-roughness-sidewall striation~~ amount is calculated on the basis of a Fourier frequency of the shape of a mask ~~edge-roughness-sidewall striation~~ portion.

5. (Original) An etching apparatus according to claim 1, wherein an optical emission spectrometer is used as said plasma monitor.

6. (Original) An etching apparatus according to claim 1, wherein said required condition is a time required for the trimming treatment.

7. (Withdrawn) A mask trimming method in which a wafer having on the surface of which a patterned mask for etching is formed is processed in a plasma etching process chamber and thereafter, plasma is generated in said plasma etching process chamber to trim-treat said mask under the etching action by said plasma so as to reduce the width of said patterned mask,

said method comprising:

measuring an amount of radicals in said plasma process chamber by means of a plasma monitor;

calculating a condition required for trimming treatment to obtain a desired mask width, on the basis of the amount of radicals measured by said monitor as well

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as a precedently measured width dimension of said patterned mask and a
precedently measured amount of mask sidewall striations; and
carrying out the trimming treatment for the calculated trimming condition.

8. (Withdrawn) A mask trimming method according to claim 7, wherein an
etching treatment is carried out in said plasma etching process chamber
continuously to execution of said mask trimming step.

9. (Withdrawn) A mask trimming method according to claim 7, wherein said
required condition is a time required for the trimming treatment.

10. (Currently Amended) An etching apparatus functioning to process a
wafer having on a surface on which a ~~desirably~~-patterned mask for etching is
formed, in a plasma etching process chamber and trim-treat said mask under
etching action by plasma so as to reduce the width of said patterned mask to a
target width, said apparatus comprising:

a plasma monitor for measuring an amount of radicals in said plasma process
chamber; and

trimming condition calculating means for calculating a condition required for
said trimming treatment to obtain a desired mask width on the basis of a precedently
measured width dimension of said patterned mask and a precedently measured
amount of ~~lateral edge roughness~~-laterally sidewall striations along vertical mask
sidewalls, as well as the amount of radicals measured by said plasma monitor,

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wherein the trimming treatment is carried out for the trimming condition calculated by said trimming condition calculating means.

11. (Previously Presented) An etching apparatus according to claim 10, wherein continuously to said trimming treatment, a treatment of etching said wafer is performed in said plasma etching process chamber.

12. (Currently Amended) An etching apparatus according to claim 10, wherein the ~~lateral edge roughness~~ sidewall striation amount is calculated on the basis of an aspect ratio of a mask edge ~~roughness~~ sidewall striation portion.

13. (Currently Amended) An etching apparatus according to claim 10, wherein the ~~lateral edge roughness~~ sidewall striation amount is calculated on the basis of a Fourier frequency of the shape of a mask edge ~~roughness~~ sidewall striation portion.

14. (Previously Presented) An etching apparatus according to claim 10, wherein an optical emission spectrometer is used as said plasma monitor.

15. (Previously Presented) An etching apparatus according to claim 10, wherein said required condition is a time required for the trimming treatment.